HEMOGLOBIN TRAITS
(Hemoglobin C, D or E Carrier)

Hemoglobinopathy screening identifies infants with sickle cell anemia as well as other hemoglobin disorders. The pattern of hemoglobin FAC, FAD, FAE indicates a hemoglobin TRAIT (carrier).

Hemoglobin C, D or E is a recessively inherited variation of normal adult hemoglobin (hemoglobin A) caused by a beta chain variation. These variations began as a response to the selective pressure of malaria. This is a benign state and individuals with a trait (carrier) are clinically normal.

Hemoglobin	Beta Variation	Trait Outcome	Ancestry
C	Lycine substituted for Glutamic Acid at codon 6 of the β chain.	Clinically benign	West Africa Mexico Central America
D D_{Punjab}	Glutamic Acid substituted for Glutamin at codon 121 of the β chain.	Clinically benign	Pakistan North Western India British Isles & Ireland
E	Lycine substituted for Glutamic Acid at codon 26 of the β chain.	Normal hemoglobin level with microcytosis	Southeast Asia

Inheritance

If one parent has C, D or E trait (AC, AD, AE) and the other has normal hemoglobin (AA), then none of the children will have a hemoglobin disease. There is a one in two chance with each pregnancy that the child will get one copy of the C, D or E gene and therefore have a trait.

If both parents have the C, D or E trait , there is a one in four chance with each pregnancy that the child could be born with C, D or E disease (two CC, DD or EE genes), and there is a one in two chance with each pregnancy that the child will get the C, D or E trait.

Genetic consultation prior to child bearing years is recommended. These traits when combined with a sickle cell or beta thalassemia gene can result in significant disease.

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